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Title:
STORAGE CONTAINER

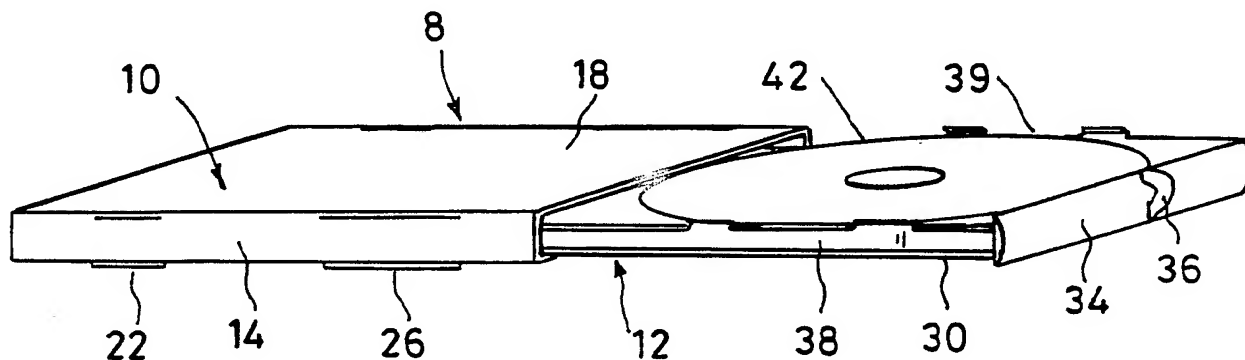
Abstract:

A storage container, especially for compact discs or magnetic tape cassettes comprises a drawer guided and sliding in a housing. The housing is, near or at its upper and lower side edges, equipped with paired, complementary-shaped connecting elements, thus permitting joining of several storage containers into a solid stack. At drawer and housing, devices are provided which firmly detain the object to be stored when the container is closed, making the storage container suitable for transport and also as a case serving as the original packaging, for instance for a compact disc.

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(57) Abstract

A storage container, especially for compact discs or magnetic tape cassettes comprises a drawer guided and sliding in a housing. The housing is, near or at its upper and lower side edges, equipped with paired, complementary-shaped connecting elements, thus permitting joining of several storage containers into a solid stack. At drawer and housing, devices are provided which firmly detain the object to be stored when the container is closed, making the storage container suitable for transport and also as a case serving as the original packaging, for instance for a compact disc.

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STORAGE CONTAINER

The invention concerns a storage container, especially for data carriers, as for instance compact discs or magnetic tape cassettes, where an object to be stored is held in a drawer sliding and guided in a housing.

Existing storage containers for this purpose, especially for tape cassettes or compact discs, comprise a housing with a number of drawers. Usually these storage containers are sold separately from the objects to be stored. The objects to be stored come in their own boxes, as for instance snap-lid cases.

These original containers are often unsuitable for systematic and easy-to-find storage of the objects to be stored, as it is not possible to join the containers into a larger unit since each container has to be removed from its storage location in order to be able to open the container and to remove the stored object.

Conventional storage units suffer the disadvantage that the objects to be stored can be held in the storage unit, but information supplied with the object, for instance the information booklet for a compact disc, cannot be accommodated in the unit. Furthermore, these storage units require opening of the drawer in order to identify the object in the drawer. There do exist storage units where the front panel of the drawer has an indicator providing information whether the drawer contains

an object or not; more detailed information, as to which specific object is held in the container, cannot be displayed.

The invention on hand aims to provide a storage container of the type described above, where the storage container can double as original packaging and transport case during shipping for the object to be stored and where the container, without modifications, can be used as stationary storage container within a system after having served as original packaging and transport case.

The invention on hand performs these tasks by equipping a container, which can be used as original packaging and transport case for the object to be stored, with paired and matching connecting elements at the upper and lower sides of the housing and with devices provided at the drawer and at the housing to detain the object to be stored when the container is closed.

By arranging the connecting elements at the lower and upper sides of the housing, it is possible to join and connect several containers into a firm self-supporting stack. By placing these connecting elements at the sides it is assured that the top and bottom are level and nearly uninterrupted, so that for instance a container made from transparent material permits unimpeded view of the object in the container respectively onto an informative booklet or an inserted label.

The devices provided at the drawer and at the housing to detain the object when the container is closed, make sure that the object is held firmly during transport and thus is protected against damage.

Where a transparent area is provided at the front of the drawer, the object held in the container can be identified, respectively an inserted label displaying information can be read.

An exceptionally simple and reliable connection of several storage containers is described in claim 5, which is especially efficient when shaped as described in claim 6, as the connecting tabs project only to one side (the bottom) whereas the top has no interfering projections and only the connecting recesses at the sides.

If the connecting tabs are made to be flexible sideways as described in claim 7, the storage container can be joined to another storage container, or to a suitable base plate, with a vertically downward movement, thus making it possible to add further storage containers to the stack even where no space is available next to the stack. In order to facilitate such vertical stacking, the storage container can be executed according to claim 8, possibly with slightly conical connecting tabs to assist alignment.

In order to achieve easy and reliable movement of the drawer in the housing, grooves according to claim 9 may be provided at the sides

of the housing. Such an arrangement may be formed either by recesses in the sides of the housing or by rail-like projections from the housing sides inwards.

An exceptionally economic design is described in claim 10, where the bottom of the drawer serves as bottom of the container, eliminating the need for a separate bottom of the housing. With this arrangement it is highly advantageous to pattern the container according to claim 11, where the bottom of the drawer, when closed, runs under the rear panel of the housing and thus safely prevents the container from caving-in under pressure in this area.

If the storage container is shaped to hold a compact disc, the design according to claim 12 is advantageous, since the compact disc is held only at or near the rim, where it does not carry data. The circular area of the compact disc that does hold data is held in the drawer without touching anything. It is of special advantage when the supporting areas are formed by support elements at the side panels of the drawer, as described in claim 13. Where the support elements are arranged at a certain distance from the bottom of the drawer, according to claim 14, a space is formed beneath the compact disc between the underside of the supporting elements and the bottom of the drawer, where for instance an informative booklet can be inserted. The thickness of the supporting elements causes a distance between the bottom of the compact disc, which carries data, and an informative booklet, keeping the data carrying surface of the compact disc from contact with other objects,

even if an informative booklet is inserted. Where the supporting elements are shaped to embrace the circumference of a compact disc to be stored, according to claim 15, a compact disc inserted in such a container is kept from lateral movement by the vertical sides of the supporting elements. The supporting elements should project inwards as little as possible in order to facilitate insertion of labels and still achieve safe storage of the compact disc.

An arrangement according to claim 16 is especially advantageous since the slots at the top of the sides of the drawer permit grasping of a compact disc at its circumference between index finger and thumb, thus avoiding touching of the data carrying surface when removing the compact disc. It should be understood that in this area of the slot the side panel must be low enough to keep it from touching the compact disc from below.

If the front panel of the drawer is executed as a convex, cylindrical and transparent lens, as described in claim 17, inscriptions on a label placed in the drawer can be read very easily, thus making it simple and unproblematic to see from the front which compact disc should be located in the storage container.

It is also advantageous to use rails protruding from the sides of the housing according to claim 18. When the storage container is closed, these rails detain the compact disc, preventing its movement

in the container. These rails also prevent removal of the compact disc from the drawer, unless the drawer has been pulled out far enough (approximately two thirds of its depth) that the compact disc can be grasped at the sides. If the rail is arranged at a distance from the top of the housing, according to claim 19, it does form a space where an informative booklet may be inserted. This is of special advantage when the container is used as original packaging and the informative booklet, which often bears a pictorial front page, is meant to be visible through the transparent top of the container.

By providing an insert near or at the front panel of the drawer according to claim 20, front support for a compact disc is achieved and a label inserted at the front is being held, being pressed particularly against the front, thus enhancing readability of the inscription on the label through the front panel of the drawer.

If the insert is provided, according to claim 21, near or at its centre, with an oblique plane, located below the supporting elements for the compact disc, it facilitates insertion of an informative booklet underneath the compact disc into the space formed by the drawer bottom and the underside of the supporting elements. This also facilitates removing of the informative booklet, enabling the buyer of a compact disc to remove the informative booklet from the top and, once the storage container has been joined with other containers into a stack, insert the informative booklet into the space formed beneath the compact disc, where the informative booklet is more easily accessible.

Where the top edge of the insert is shaped towards the ends according to claim 22, it facilitates insertion of the informative booklet right against the back of the housing during automatic packing by the manufacturer of the compact disc. Likewise this arrangement makes sure that the front of the compact disc, namely the area where the compact disc rests in the insert, is not obliterated by the informative booklet, but showing at any time whether the container holds a compact disc or not.

An advantageous arrangement is described under claim 23, where the drawer, driven by the power of a pre-tensioned spring, moves out of the housing when the locking device has been released. Preferably, the spring power should be set to move the drawer only 15mm to 25mm out of the housing, so it can be grasped and pulled out fully. Preferably, the locking device comprises a spring-loaded catch at the drawer which engages a matching recess in the housing when the drawer is closed. Releasing the catch can be done by means of a single-piece release lever, projecting slightly from the housing and connected to the locking catch. Alternatively the locking element can be formed by a flexible element at the housing, which engages the drawer with a hook-like action when closed.

A simple, low-cost development of this design is described in claim 24. Here the spring need not be arranged directly at the drawer, but can be provided at the insert. Preferably it forms one piece with the insert, which can be manufactured in one operation together

with the insert, for instance using injection-moulded plastic.

By placing the spring in an enclosed space, it is protected against mechanical ingress from the top, thus preventing accidental breakage when handling the drawer and keeping the spring invisible, resulting in a neat appearance of the opened drawer. The shape of the groove in the insert, open to the side, which is engaged by the rail at the corresponding side of the housing when the drawer is closed, with the rail engaging and tensioning the spring, adds a third function to this rail in addition to locating the compact disc and holding the informative booklet slipped into the top of the container, namely working the spring. There is a fourth function performed by the rail, it makes sure that the drawer is retained against complete withdrawal from the container, accidentally.

The arrangement according to claim 25 is also especially advantageous, as the shape of the locking element at the side of the insert, preferably at the side where the spring is located, concentrates the mechanical functions at the storage container in a small area. Especially when the locking element is executed according to claim 26 or 27 it forms one piece with the insert, for instance as an injection-moulded part, this results in benefits for the manufacture, since only one component of the storage container comprises intricately shaped and flexible parts. In this case, the substantial part of the manufacturing costs comprising moulding/tooling costs and costs of high-quality material, can be restricted to the insert including spring and locking element whereas the housing and the drawer can be manufactured from lower-quality, less costly material and with relatively simple tools and moulds.

The invention will be described below in detail with reference to the drawings; the drawings show:

- Figure 1 a perspective view of a storage container for compact discs according to the invention,
- Figure 2 an elevation of the storage container shown in figure 1,
- Figure 3 a rear view of the storage container shown in figure 1,
- Figure 4 a storage system according to the invention,
- Figure 5 an enlarged section along the line 5-5 in figure 4,
- Figure 6 a view of an interlocking base plate,
- Figure 7 a plan view onto a different execution of a storage container with opened drawer.
- Figure 8 enlarged sections through two different arrangements of
and 8a the locking device from figure 7 in the closed position,
- Figure 9 a cut-off front elevation showing two stacked storage containers,
- Figure 10 an enlarged detail of an arrangement to retain the drawer of the storage container in the housing, detachable,

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- Figure 11 the view of a base plate to connect two adjacent stacks of storage containers,
- Figure 12 the drawer for another arrangement covered by the invention,
- Figure 13 a housing for the above arrangement,
- Figure 14 a section through a drawer along the lines I-I in figures 12 and 13,
- Figure 15 a section through the rear of a drawer, inserted into the housing along the lines II-II in figures 12 and 13,
- Figure 16 an enlarged detail X as marked in figure 12,
- Figure 17 detail X with part section of the insert and the drawer closed,
- Figures 18A sections along the line III-III in figure 16, showing
to 18E various locking devices,
- Figure 19 a schematic view of a particular arrangement of the invention for the storage of audio tapes.

A storage container 8 takes the shape of a low, box-shaped structure comprising a housing 10 and a drawer 12.

The housing 10 comprises a rear panel 13, two side panels 14 and a top panel 18. At the side panels 14 two pairs of complementary arrangements 20, 22 and 24, 26 are provided. The arrangements 20, 24 comprise recesses and are flush with the top panel of the housing 10, whereas the arrangements 22, 26 are formed by hooks and protrude downwards past the bottom of the housing 10. The rear panel 13 includes a further hook-shaped arrangement 28 and a complementary recess 29.

The drawer 12 includes a bottom panel 30 which slides in the grooves 32 which are arranged in the side panels 14 and include a vertical flange 34 at the front of the drawer 12, which forms the front panel of the container 8. There is a handle 36 arranged at the flange 34 in order to facilitate operation of the drawer 12, which can be pulled out completely from the housing 10. At the bottom 30 of the drawer 12 two vertical side panels 38 are arranged, each including a recess 39.

Along the upper part of the side panels 14 a pair of grooves 40 is arranged, in order to accommodate a pamphlet or other printed matter associated with the compact disc held in the container.

For the intended use a compact disc 42 is placed on the bottom of the drawer 12, with opposing arc-shaped parts of the compact disc 42 engaging the recesses 39, thus detaining the compact disc in the container. The drawer 12 is then pushed into the housing in order to close the container.

To form a stack of storage containers the hook-shaped arrangement 28 at the back panel of the upper storage container is inserted into the rear recess of the lower container, in order to prevent a relative lateral movement between the two containers. The upper container is then tilted downwards to engage the hook-shaped arrangements 22, 26 in the recesses 20, 24 and thus join the two containers 8. To detach the containers 8, the operation is performed in reverse order.

It should be noted, that this arrangement permits assembling or disassembling a stack of containers 8 speedily when required. Furthermore, the order of compact disc in a stack can be changed easily by removing the drawers 12 and swapping the compact discs and their associated informative booklets or even the entire drawer. This operation can be performed without separating the storage containers.

In order to join adjacent stacks of storage containers 8 sideways, each stack includes a base plate 44. According to figure 6 each base plate 44 comprises recesses 46, 48 and 50 which match the recesses 20, 24 and 29 of each storage container and which engage the hook-shaped arrangements 20, 26 and 28 of the lowest storage container in the stack.

Each base plate 44 includes two further recesses 52, 54 at the one side and two complementary protrusions 56, 58 at the opposite side. Adjacent stacks can be joined by firstly engaging the protrusion 56 of a base plate with the matching recess 52 of the adjacent base plate 44 and then swinging the two stacks together till the front protrusion 58 engages the recess 54 thus joining the two stacks sideways.

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Since the storage containers as used for compact discs are fairly low, it might prove difficult to read the title of the compact disc as displayed at the front of the storage container. In order to circumvent this difficulty, the front of the storage container according to the invention, is given a curvature 60 which optically enlarges the lettering.

It should be noted further, that the storage container according to the invention is suitable both as the original packaging for the sale of a compact disc and for storage of compact discs in conventional cases. Since the storage container according to the invention has the same outside dimensions as the conventional cases for compact discs, it can be kept in conventional storage systems.

In the arrangement according to figure 7 the drawer 12 is equipped with a spring 62, with the tension of the spring moving the drawer 12 into a position where it is opened completely and the compact disc 42 can be removed from the drawer 12.

In figures 8, 8a and 9 the drawer is shown in its closed position, where it is engaged by a flexible catch 64 in closed position, with the catch 64 located either in the top 18 of the housing 10 or, as described in claim 23, at the drawer. In addition, a slot or a recess 66 is provided at the bottom of the housing 10, with the slot 66 in the upper of two stacked storage containers grasping the catch at the lower storage container, permitting an upward movement of the catch to release the drawer 12.

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An additional slot or recess 68 is provided in the curved front panel 34 of the storage container, which is engaged by the catch 64 when the containers are in a closed position.

According to figure 10, the drawer 12 is retained in the housing in its pulled-out or open position by protrusions 70 at the flexible tabs at the side panels of the housing 10. This retaining device is executed in such a way, that sufficient force will overcome the spring force in the tabs 72, disengaging the locking protrusions from the recess 74 and permitting the removal of drawer 12 from the housing 10.

In the arrangement shown in figure 7, the compact disc 42 is held in position within the drawer 12 by two tabs 76 provided at the insides of the side panels 14 of the housing. When the drawer 12 is in the closed position, the tabs 76 grasp over the edges of the compact disc 42, thus holding the compact disc 42 in the drawer. Slots 78 run along both sides of the drawer, allowing the tabs 76 to pass through the slots.

Figure 11 shows a base plate 80 for joining adjacent stacks of storage containers. At three of its edges the base plate 80 has a tab 82 and a complementary recess 84. A slot 86 in the base plate near each recess 84 causes the part 88 of the recess 84 to be flexible and to yield sufficiently to admit the tab 82 when the bases 80 are joined.

Preferably the base plate is equipped with flat rubber feet, preventing it from slipping.

In place of the tab 82 and the recess 84 at each edge of the base plate 80 two tabs 82 or two recesses 84 may be provided at one edge of the base plate 80 and two recesses 84 respectively two tabs 82 may be provided at the opposite edge of the base plate 80.

A further advantage is, that a base plate can be provided in the form of a drawer, for instance for use in a motor car. Usually chosen compact discs are taken in their original packaging into the car, unpacked and introduced into a storage system provided in the car. This implies that the original packaging of the compact discs either have to be discarded or kept in the car.

With a system according to the invention, the drawers can be taken from the main storage system and placed in a portable system that fits the car. This has the advantage that the system can be clipped to a drawer-type base plate and slipped into a compartment. In this way it is no longer necessary to remove compact discs from their original packaging and introduce them into a storage system. Also, in a system according to the invention, it is much easier to pick a particular compact disc for playing as the container comprises a suitable display front.

Figure 12 shows the drawer 101 in another execution of the invention. The drawer 101 comprises a drawer bottom 110 which doubles as the housing bottom, two side panels 111, 112 plus a front panel 113 in the shape of a cylindrical lens.

At the upper edges of the side panels 111, 112, the panels are shaped to form support elements 114, 114', 115, 115', which protrude inwards and mainly parallel to the drawer bottom 110.

The support elements 114, 114', 115, 115', comprise generally flat support areas 114 A, 114 B, 115 A, 115 B, located at a vertical distance from the top edge of the side walls 111, 112, roughly equal to the thickness of a compact disc 104 (figure 14). The support areas 114 A, 114 B, 115 A, 115 B, are located on a circular curve with a diameter approximately equal to the outside diameter of a compact disc. The support area thus forms an annular plane with a very small radial width, supporting the compact disc 104 only at its outer part which does not carry data.

Beginning at the support areas the top of the support elements runs at an incline 114 C, 114 D, 115 C, 115 D inwards and towards the drawer bottom 110. This arrangement provides clearance to the data-carrying surface 104' of the compact disc 104. The bottom of the support elements 114, 114', 115, 115', runs approximately parallel to the drawer bottom 110 at a vertical distance b from the drawer bottom. The distance b is slightly larger than the thickness of an informative booklet provided with the compact disc, permitting insertion of such booklet into the recess formed by the distance b .

Near or at the middle of the side panels 111, 112, where the largest diameter of a compact disc 104 resting on the support elements meets the side panels, the side panels are equipped at the top with recesses 116, 117.

These recesses permit the compact disc to protrude slightly over the inside of the panels 111, 112.

Preferably the recesses 116, 117 are slightly tapered making it possible to grasp the compact disc through these recesses between index finger and thumb.

The housing 102 shown in figure 13 comprises a top panel 120 (figure 14), side panels 121, 122 and a rear panel 123.

At the lower edges of the side panels 121, 122 inward pointing rails 121', are provided which form the lower guides for the drawer 101. At the inside panels 121, 122 are shaped to form inward pointing rails 124, 125. These rails 124, 125 form the upper guide for the drawer 101. At the same time the rails 124, 125 enclose the compact disc, thus detaining the compact disc 104 when the drawer is closed (figure 14). Between the tops of the rails 124, 125, which run generally parallel to the top panel, and the underside of the top panel, clearance a is provided which largely matches the distance b, permitting insertion of an informative booklet for the compact disc into this gap.

Figure 14 shows, in dotted lines, a recess 126 at the top of the housing 102 for joining a further container. At the lower edge of the housing 102 a connecting tab 127 is shown, which is intended for connection to another storage container below. The connecting tab 127 includes a v-shaped groove 127' which matches the v-shaped rail 126' in the recess 126. Preferably the connecting groove 127' has, at least at one end, a part of

the panel 127'' projecting into the groove, which provides extra strength against breakage. Matching this, the corresponding end of the upper connecting rail 126' includes a recess 126'' to accommodate the protrusion 127'' of the panel.

Figure 15 shows the storage container in its closed state, with the drawer 101 pushed completely into the housing 102. In this state the rear panel 118 of the drawer and the rear panel 123 of the housing touch more or less completely. The bottom of the drawer 110 comprises a tab 110' protruding towards the back past the rear panel 118 which engages an opening 123' at the lower edge of the rear panel 123 of the housing 102. This arrangement counteracts vertical pressure by the rear panel 123 of the housing, preventing the drawer from being pushed upwards into the housing.

At the drawer, near the front panel 113, an insert 103 is provided which preferably is held by friction or by interlocking studs 131 fitting into holes 112' of the associated side panel 112 of the drawer (figure 16). In place of studs and holes a rib 131' may be provided at the insert, engaging a groove in the side panel.

The insert 103 is, near or at its middle, shaped to match the support elements 114, 115 and comprises a support area 130 plus an incline 132 continuing from there inwards. The incline 132 is followed by a further, less steeply inclined plane. At this additional incline 133 two nose-shaped tabs 133', 133'' protrude towards the back in direction of the housing. These oblique protrusions 133', 133'' facilitate insertion of an informative

- 19' -

booklet into the lower gap between the supporting elements 114, 114', 115, 115' and the top of the drawer bottom 110.

The insert 103 is provided at one side with a recess 134, open towards the side (figure 16, figure 17). This recess 134 forms, at the outer side of the insert 103, a horizontal groove 135 which engages the rib 125 located at the inside of the side panel 122 of the housing 102. When the rib 125 enters the groove 135, the front of the rib 125' presses on the head 136' of the spring lever 136 which forms one piece with the insert. The spring lever 136 is, near or at the middle of the insert 103, at its rear end facing the housing 102, firmly connected to the insert 103 in such a way that shifting the head 136' when closing the drawer results in a deformation of the spring lever 136 which in turn builds up spring tension (figure 17).

On the side where the insert 103 is provided with a spring 136, a catch 105 is provided that includes a protrusion 150 which fits into an opening in the front panel 113 of the drawer 101. The catch arrests the drawer in the closed position.

Figures 18 A to 18 E show differing versions of the catch. In the figures equivalent elements are given the same reference.

Figure 18 A shows a section through part of two stacked and joined storage containers, along the line III-III in figure 16.

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In the container shown on top, an arrestor 105 is provided, which is vertically movable against the force provided by a spring element 151 located at the bottom of the arrestor 105 and has an operating tab 150 which engages in an opening located in the front panel 113 of the drawer 101. The spring element 151 is supported mainly by the drawer bottom 110. At its top the arrestor 105 is equipped with a catch 152 which engages a matching opening in the top panel 120 of the housing 102. The catch 152 is provided, at the face pointing towards the front of the drawer, with a vertical plane in order to transmit the force acting in direction of the opening drawer to the upper panel 120 of the housing 102. At the plane facing the back of the drawer, the catch 152 slopes downwards, causing the front edge of the upper panel 120 to press the catch 152 automatically downwards when the drawer is closed.

The lower container shown in figure 18 A is similar to the arrangement shown for the top container, but with the spring element 151' located at the lower end of the handling tab 150' and supported by the upper edge 113' formed by the opening in the front panel 113. The arrestor 105' runs here in a front and rear vertical dovetail guide 153, 153' provided in the insert 103, with the rear dovetail guide 153' stopping short of the drawer bottom, thus forming a stop 153'' for the arrestor 105, preventing it from moving upwards when the drawer is open.

Figure 18 B shows an execution of the arrestor similar to the one shown in the top container in figure 18 A. Here the spring element 151 is joined at one end with the arrestor 105 and at the other end with the insert 103 and formed in an area of thin, flexible panel wall. This

arrangement permits manufacture of the arrestor 105 and manufacture of the insert 103 in one operation, since both form one unit.

A further execution of an arrestor 105, which can also be made in one piece with the insert 103, is shown in figures 18 C through 18 E. Figure 18 E shows an elevation according to figures 18 A and 18 B, figure 18 C shows a section seen from the front along the line IV-IV in figure 18 E, and figure 18 D shows a plan view of the arrestor 105 and insert 103, both forming one piece, after manufacture.

The spring element 151 is formed by a thin, level and preferably plane protrusion near or at the bottom plane of the insert 103. In order to insert the arrestor 105, it is turned anti-clockwise through 90° (in figure 18 D), bending the spring element 151. The insert 103, together with the arrestor 105, is then placed into the drawer 101.

The spring force exerted by the deflected spring element 151 pushes the arrestor 105 into the engaged position with upward pressure (figure 18 E). The deflection of the spring element 151 permits a vertically downwards movement of the arrestor 105, thus permitting the catch 152 to be moved downwards out of the opening 120' in the top panel.

The opening 120' in the top panel need not penetrate the top panel, it is sufficient if this opening is just a recess at the inside of the top panel, leaving the upper side of the top panel smooth and uninterrupted.

Furthermore, a cupola-shaped protrusion 124' may be provided at the

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inner, free end of one or both rails 124, which in conjunction with a cupola-shaped protrusion 118', projecting upward from the rear panel 118 of the drawer 101, prevents accidental dis-lodgement out of the housing 102. Due to the cupola shape of the protrusions 124' and 118' these can be made to slide past each other by exerting additional force and thus permit intentional removal of the drawer.

As an additional advantage of the invention it should be mentioned that twin or triple compact discs can be packed in a matching number of containers without requiring additional moulds to produce suitable boxes. This is an important economic point.

Figure 19 shows a schematic perspective view of the principles for an execution suitable for holding and storing audio tapes.

With regard to the details of construction, all executions of the described invention can be used for audio tapes, but require special locators for the audio tapes.

This includes the task to detain the tape in such a way that it is prevented from reeling and unreeling due to jolting and kept from rattling in the box. This problem is solved in principle by a specially formed spring element, either made from metal or produced by injection moulding, which will be described in detail below. If a spring element produced by injection moulding is used, the element can be manufactured preferably

in one piece with the drawer, whereas a metal spring has to be mounted in the drawer in a separate operation.

Figure 19 shows a preferred execution of the spring element, which performs several functions.

Part a of the spring element presses the label at top and bottom to the front panel of the drawer.

Part b fixes the spring element itself in the drawer, viz. it anchors the element.

Part c fixes the position of the tape, relative to the housing, in the drawer and at the same time locks the rotating rollers for reeling the tape.

Part d of the spring element provides the spring force which pushes the drawer out of the housing once the arrestor has been disengaged.

The standard procedure for loading a drawer runs as follows:

First the label for the relevant tape is placed in the drawer bottom.

Then the spring element is clipped into the drawer, which automatically fixes and secures the label. Next, the tape is placed in the drawer, with the parts c locating and detaining the tape. Following this the drawer can be closed, respectively pushed into the housing.

When the drawer is closed, the following actions take place:

The parts d of the spring element, protruding from the drawer, are deflected,

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tensioning the spring. Consequently the parts c move forward, securing first the tape and then the housing as well. By mounting the spring element, according to the invention, some distance above the drawer bottom, a gap is created between spring element and bottom which can be used to hold an informative booklet. In this way the arrangement according to the invention makes it possible to include the informative booklet for each tape as usual with compact discs; it is important that no special element is required to hold the booklet, it is held by the heavier part of the tape cassette when the drawer is fully closed.

It should be noted, that the spring principle and its associated functions as described above can also be used in connection with the storage of compact discs, which would necessitate a suitable modification of the part c in order to receive compact disc.

CLAIMS:

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1. A storage container including a housing and means on the housing for releasably securing the container to an adjacent container in stacked relationship.
2. A storage unit as claimed in claim 1 in which the securing means includes releasably interengageable connecting elements on the housing.
3. A storage unit as claimed in claim 2 in which the connecting elements are complementary.
4. A storage container where an object to be stored is kept in a drawer sliding on guides in a housing, in which the container is adapted for use as the original packaging and is equipped, at or near the upper and lower side edges of the housing with paired, complementary connecting elements and the drawer and the housing are equipped with devices to detain the object to be stored when the container is closed.
5. A storage container according to claim 4 in which the connecting elements are formed by connecting tabs protruding from the housing and by connecting recesses in the housing.
6. A storage container according to claim 5 in which the connecting recesses are located at the upper side edges and the connecting tabs are located at the lower side edges, with the connecting

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tabs being generally perpendicular to the bottom plane of the container.

7. A storage container according to any one of claims 4 to 6 in which at least the connecting tabs can deflect sideways, in order to achieve entry into the corresponding connecting recesses of another unit underneath by a generally vertical movement, thereby hooking into the recesses.
8. A storage container according to any one of claims 4 to 7 in which at the rear edges of the housing at least one pair of guide elements are provided, comprising a guide tab and a guide recess.
9. A storage container according to any one of claims 4 to 8 in which the drawer is guided and sliding in grooves provided near or at the housing side panels.
10. A storage container according to claim 9 in which in the closed state of the container, the bottom of the container is formed by the bottom of the drawer and that the front panel of the housing is formed by the front panel of the drawer.
11. A storage container according to claim 10 in which at least a part of the bottom of the drawer, in the closed state of the container, engages a suitably shaped recessed area in the back wall of the housing.

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12. A storage container according to any one of claims 4 to 11 in which on the drawer intended to hold a compact disc, supporting elements are provided, which in turn comprise generally flat supporting areas, which support a compact disc held in the drawer mainly about its outer circumference.
13. A storage container according to claim 12 in which the supporting elements are provided on the side panels of the drawer and run generally parallel to the bottom plane of the drawer.
14. A storage container according to claim 13 in which the supporting flats are located at some distance from the bottom of the drawer.
15. A storage container according to any one of claims 4 to 14 in which the shape of the supporting flats on the drawer matches the circumference of a compact disc to be stored.
16. A storage container according to any one of claims 4 to 15 in which the side panels of the drawer, near or at its centre, have a recess at the top.
17. A storage container according to any one of claims 4 to 16 in which the front panel of the drawer is in the form of a convex cylindrical lens made from transparent material.
18. A storage container according to any one of claims 4 to 17 in which on the inside of the side panels of the housing,

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rails are formed, the underside of which provide the upper guide for the associated side panel of the drawer, and which overlie the top of a compact disc placed in the drawer when the drawer is closed.

19. A storage container according to claim 18 in which the top of each rail is located at a certain distance from the top panel of the housing.
20. A storage container according to any one of claims 4 to 19, in which in the drawer, near the front panel, an insert is provided, with a height generally equal to the clearance between drawer bottom and housing top panel and which includes, near its centre, a recess into which the flat support areas for the compact disc are continued.
21. A storage container according to claim 20, in which near the centre of the insert below the support flat, at least one inclined plane is provided, running towards the drawer bottom.
22. A storage container according to claim 20 or 21, in which to the side of the centre of the insert at its top at least, one edge is provided, which runs towards the rear in the direction of the housing.
23. A storage container according to any one of claims 4 to 22,

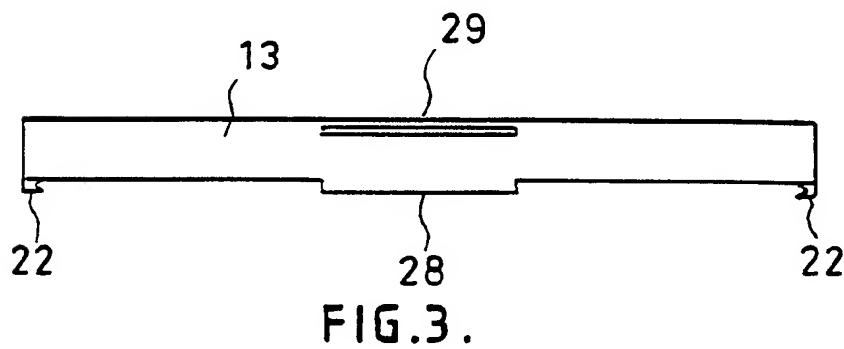
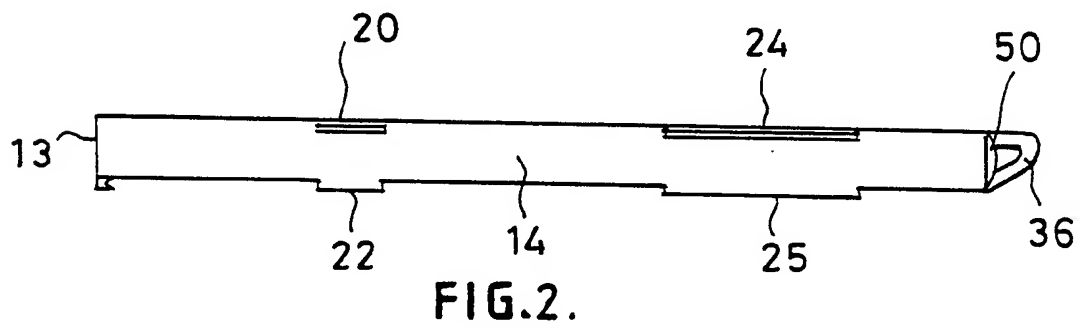
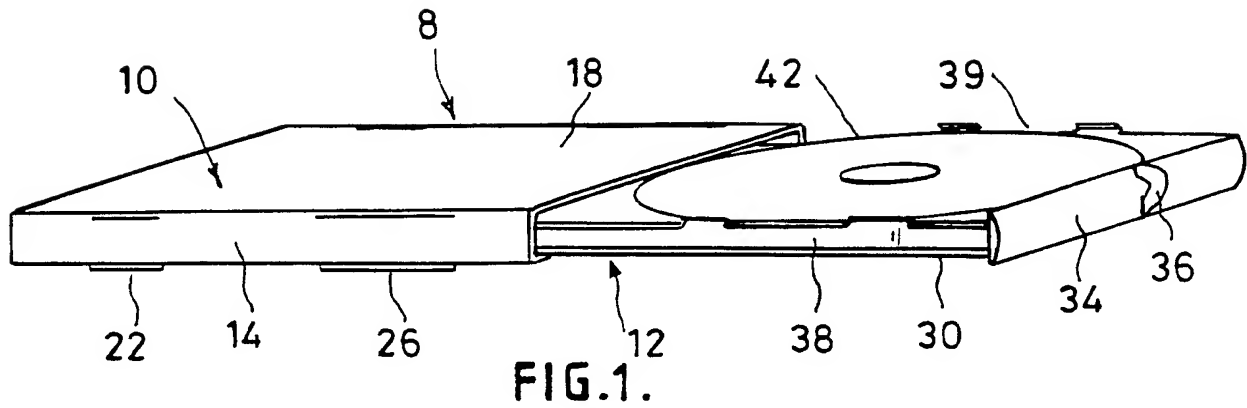
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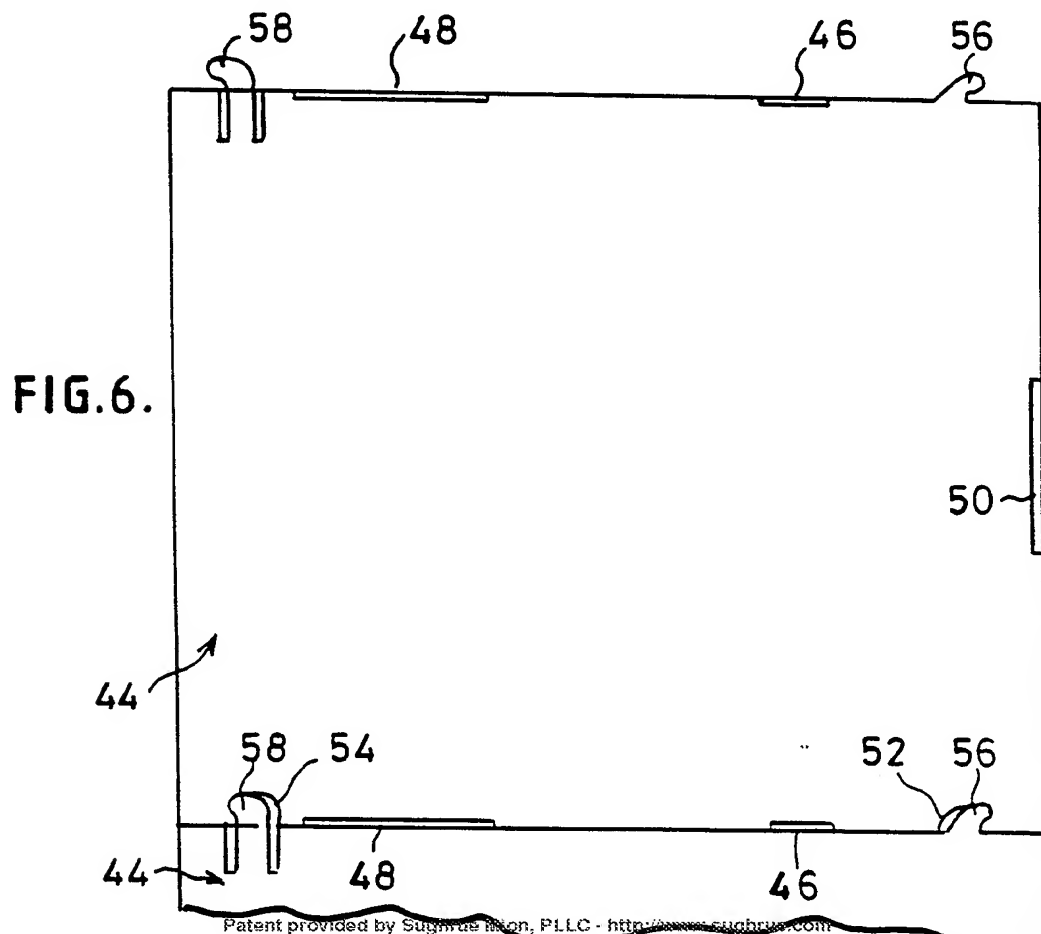
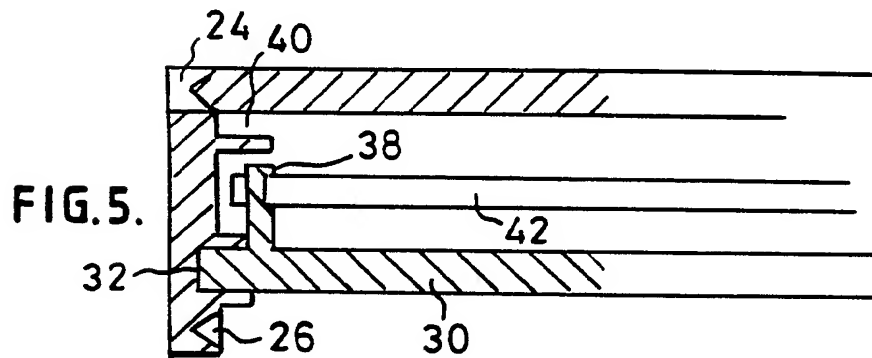
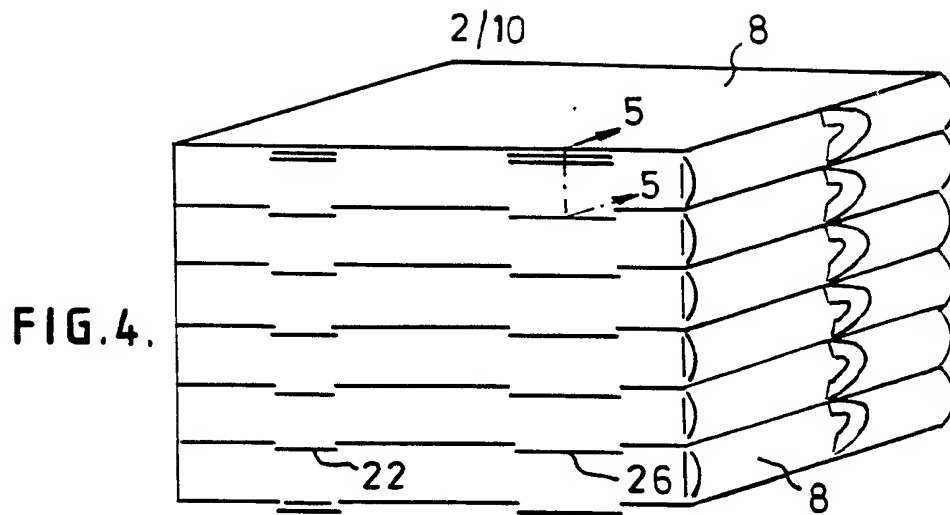
in which a spring acting against the drawer in the opening direction and a locking device detaining the drawer in closed position, are provided, with the locking device either in the form of a flexible catch on the drawer, engaging an opening in the housing in order to lock and with a release lever protruding to the front, or with the flexible locking element formed on the housing and protruding over the drawer in closed position, hooking over the drawer.

24. A storage container according to claim 23, in which the spring is provided in a side recess of the insert, and the recess includes a groove open to the side, into which the rail, provided on the inside of the adjacent housing side panel, enters when the drawer is being closed, with the front face of the rail engaging the free end of the spring, thereby tensioning the spring.
25. A storage container according to any one of claims 4 to 24, in which, near or at one side of the insert, an arrestor is provided which is vertically movable against a spring force and has an operating tab which penetrates an opening in the front panel of the drawer and with an arrestor hook at its top, which, actuated by the spring force, engages a matching recess in the top of the housing.
26. A storage container according to claim 24, in which the arrestor is joined, forming one piece, to a thin, flexible spring element, forming in turn one piece with the insert.

27. A storage container according to claim 26, in which the spring element is formed by a thin, level and preferably flat protrusion near or at the lower plane of the insert, with the arrestor joined at its free end, and with the arrestor being able to turn through an approximate right angle by bending the spring element when the insert is being mounted in the drawer.
28. A storage container for audio tapes, wherein housing and drawer are formed according to any one of the above claims, in which in order to detain the tape, a spring is used in conjunction with the drawer the spring being held in the drawer by its own tension and equipped with upward pointing elements which engage and detain the reels of the audio tape and having its free ends projecting over the rear end of the drawer, thus pre-tensioning the spring.
29. A storage container as claimed in claim 1, substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 3, or 7 and 8, or 7 and 8A, or 1 to 3 and 10, or 1 to 3 and 12 to 17, or 18A, 18B, 18C, 18D or 19 of the accompanying drawings.
30. A storage system substantially as hereinbefore described with reference to and as illustrated in Figures 4 to 6, or 9 or 11 of the accompanying drawings.

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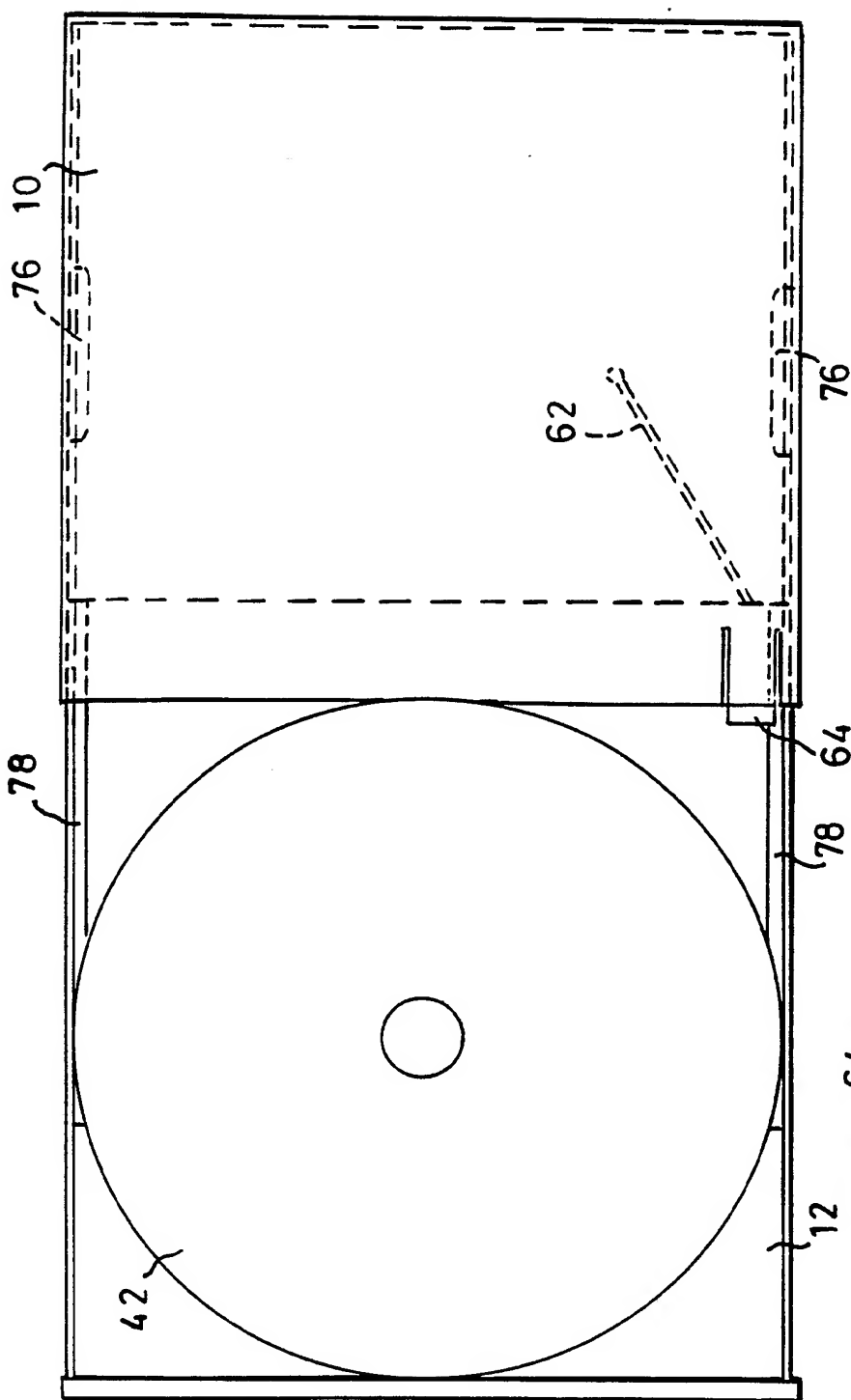


FIG. 7.

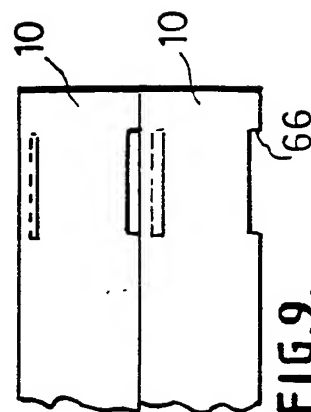


FIG. 9.

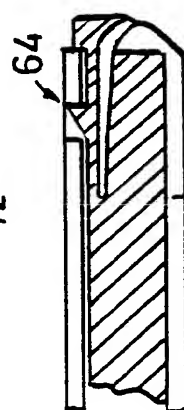


FIG. 8.

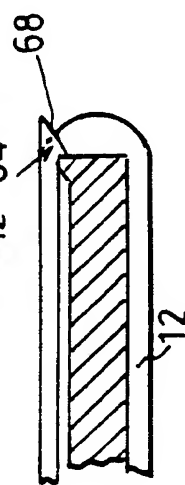


FIG. 8a.

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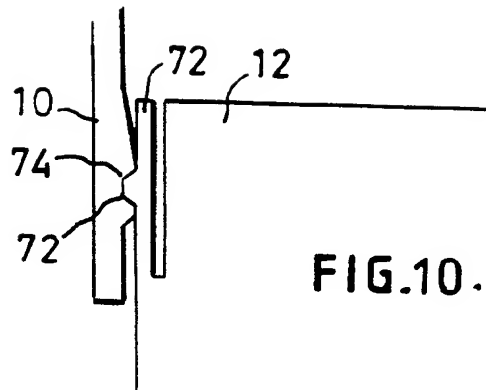


FIG. 10.

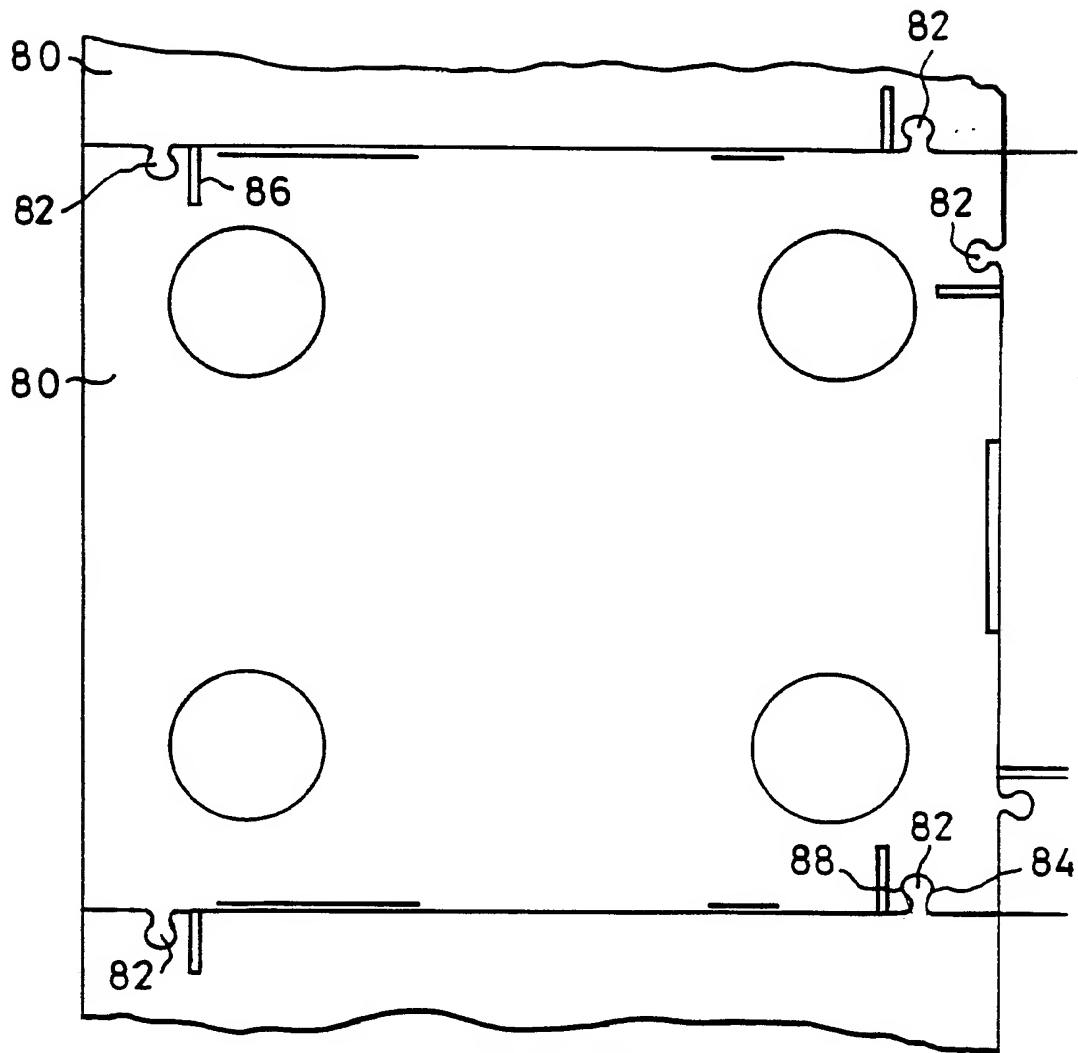


FIG. 11.

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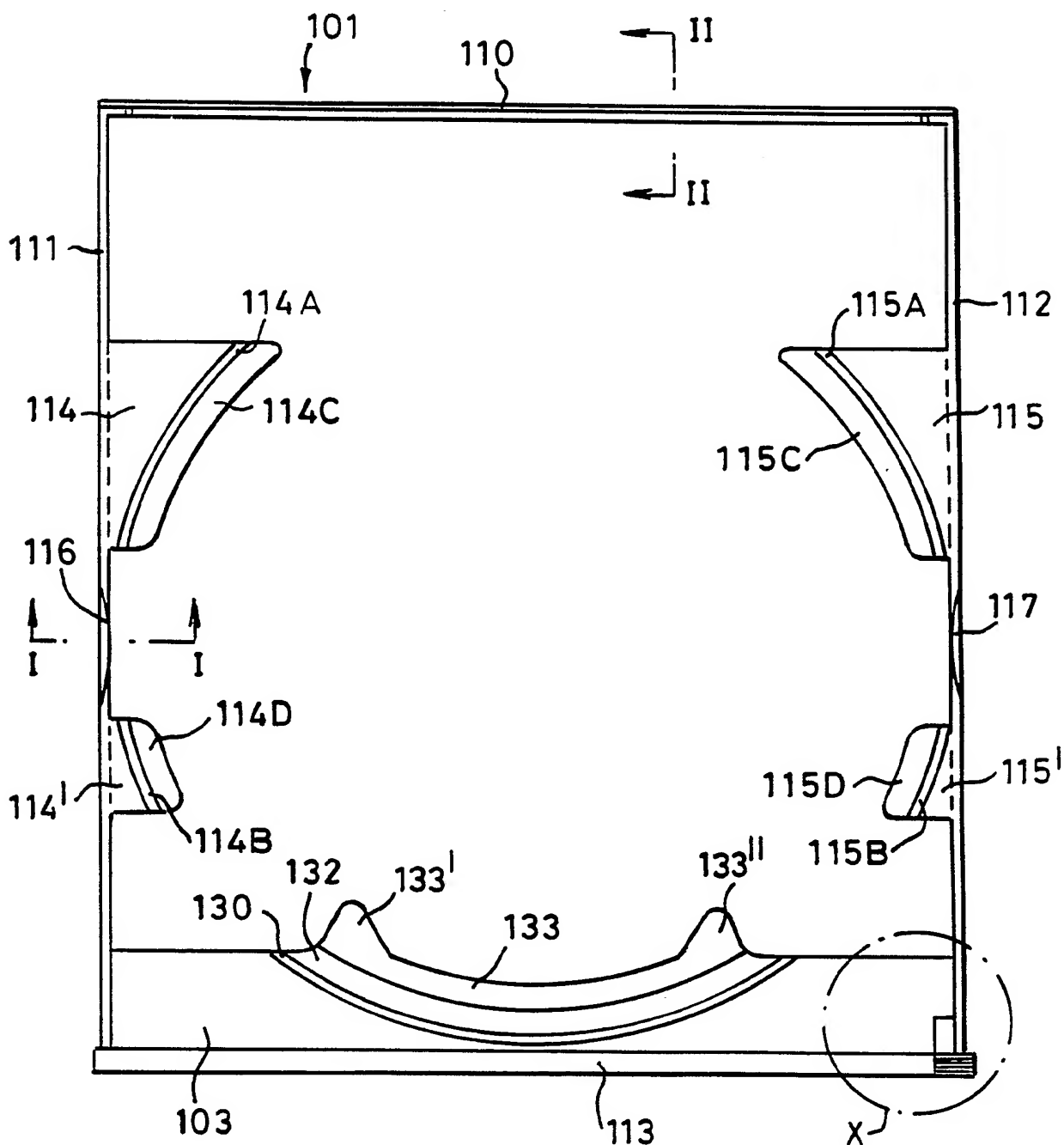


FIG. 12.

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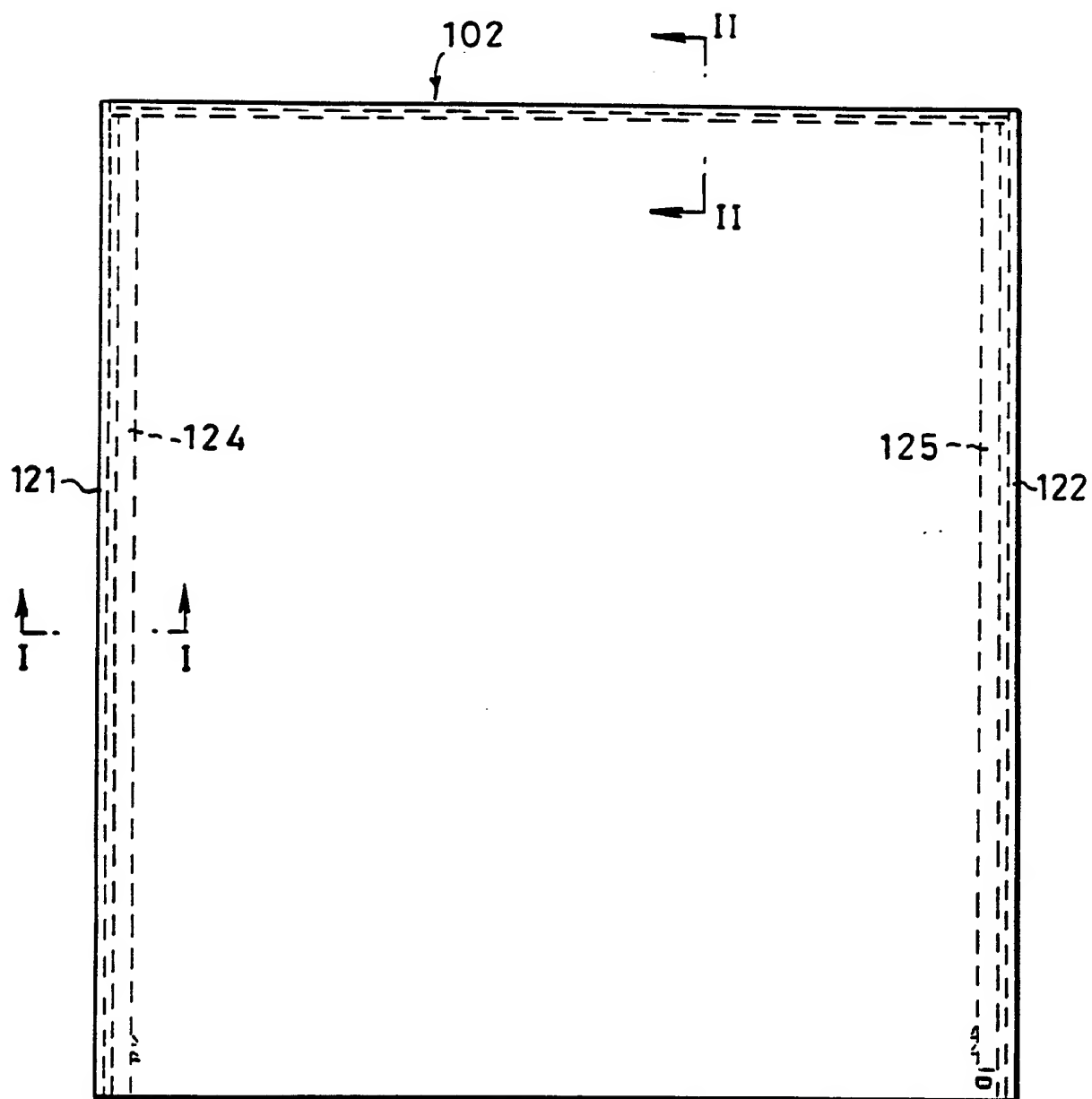
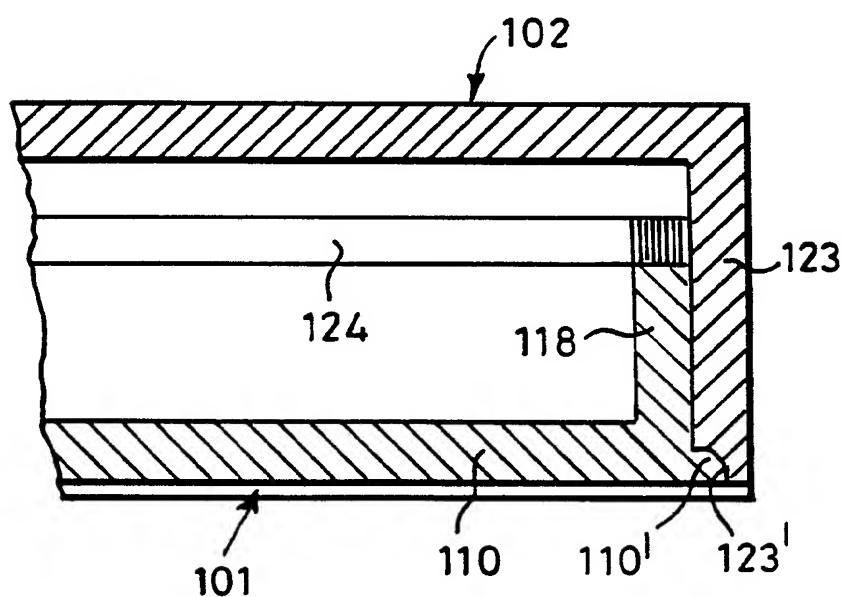
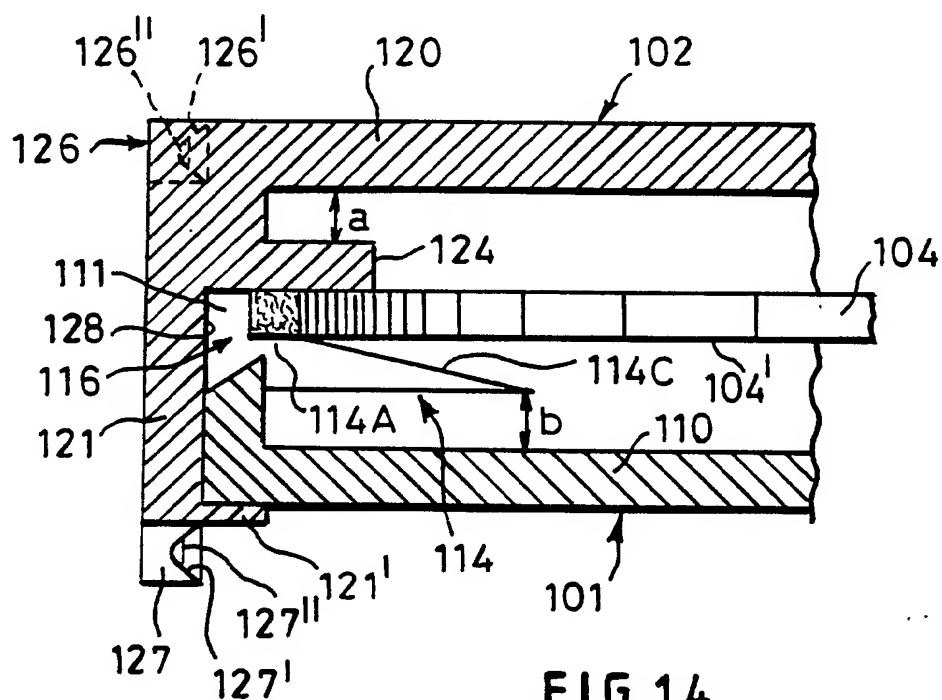


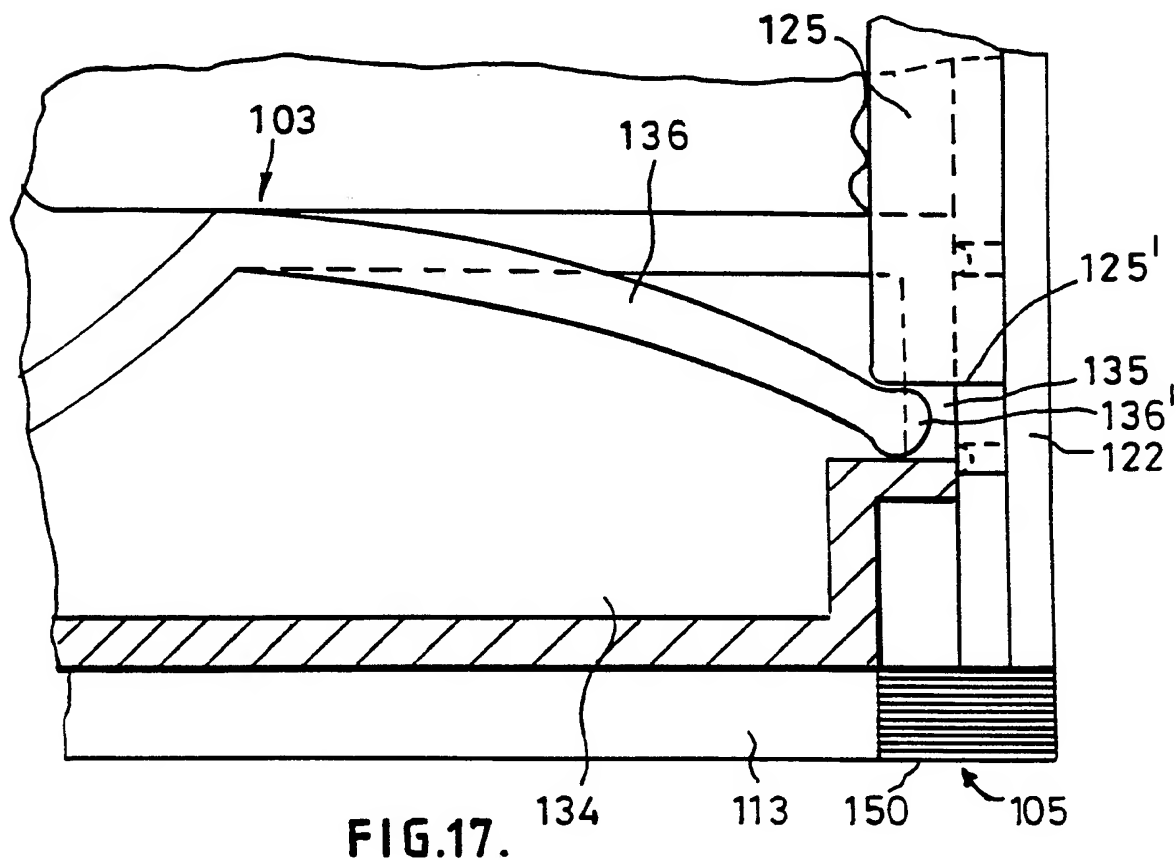
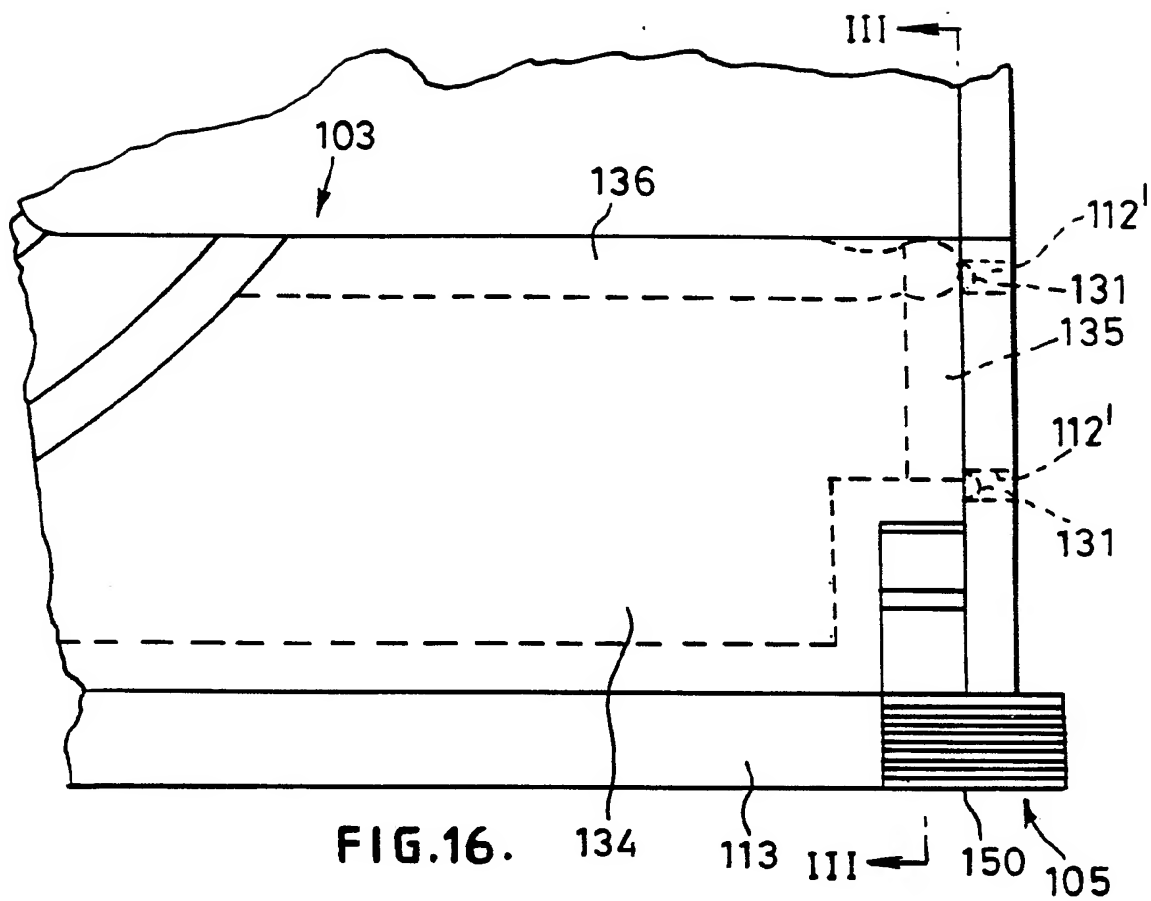
FIG. 13.

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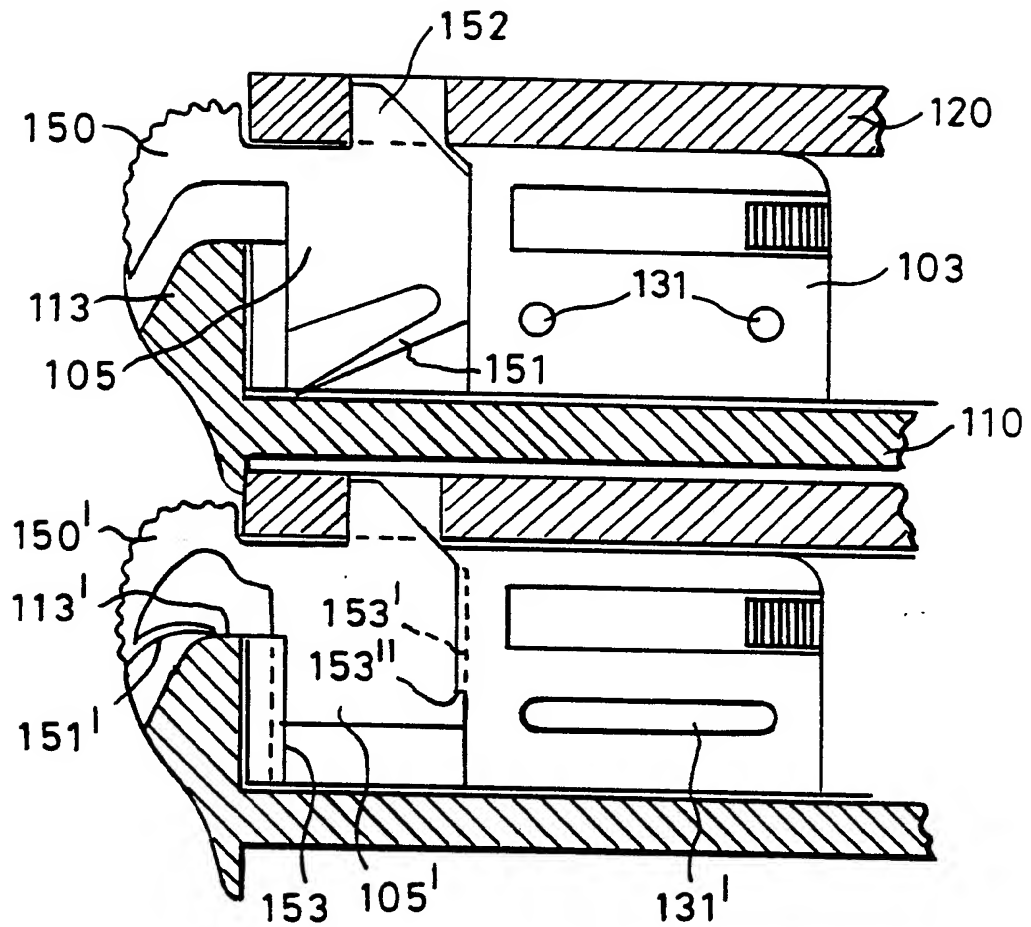


FIG.18A.

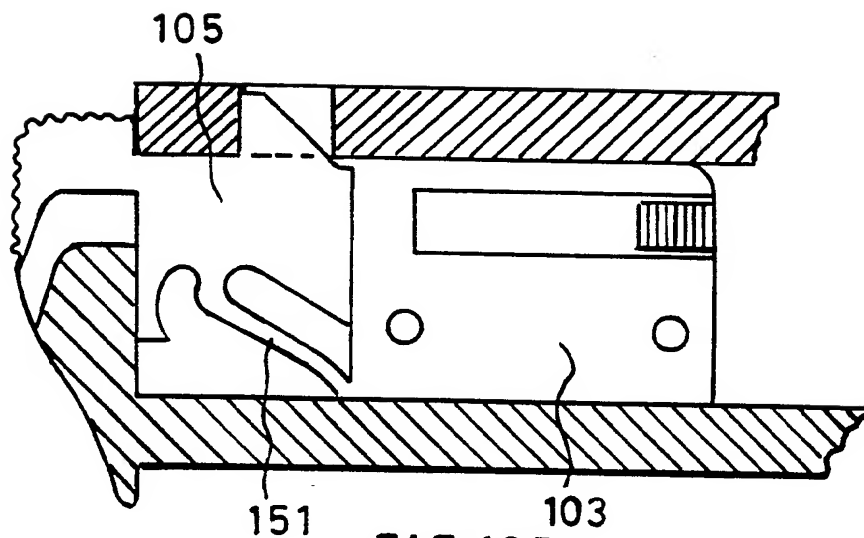


FIG.18B.

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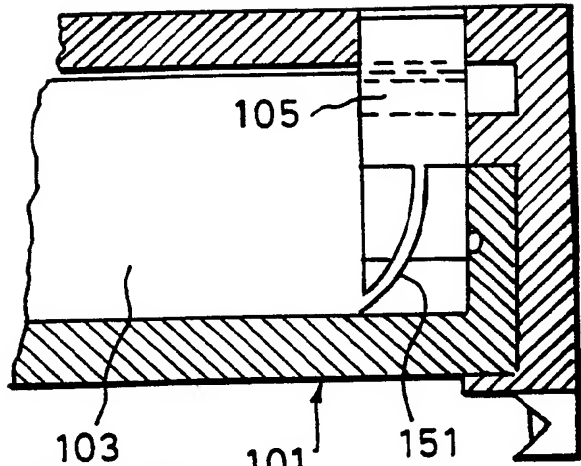


FIG. 18C.

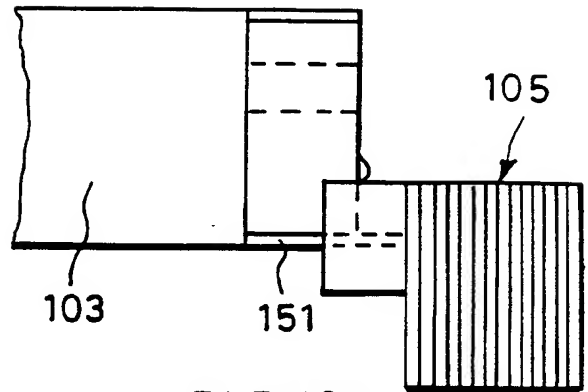


FIG. 18D.

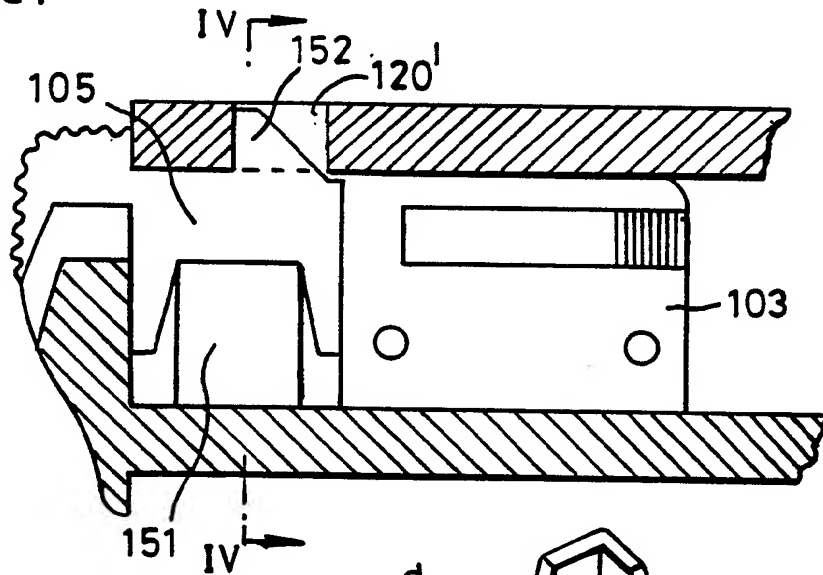


FIG. 18 E.

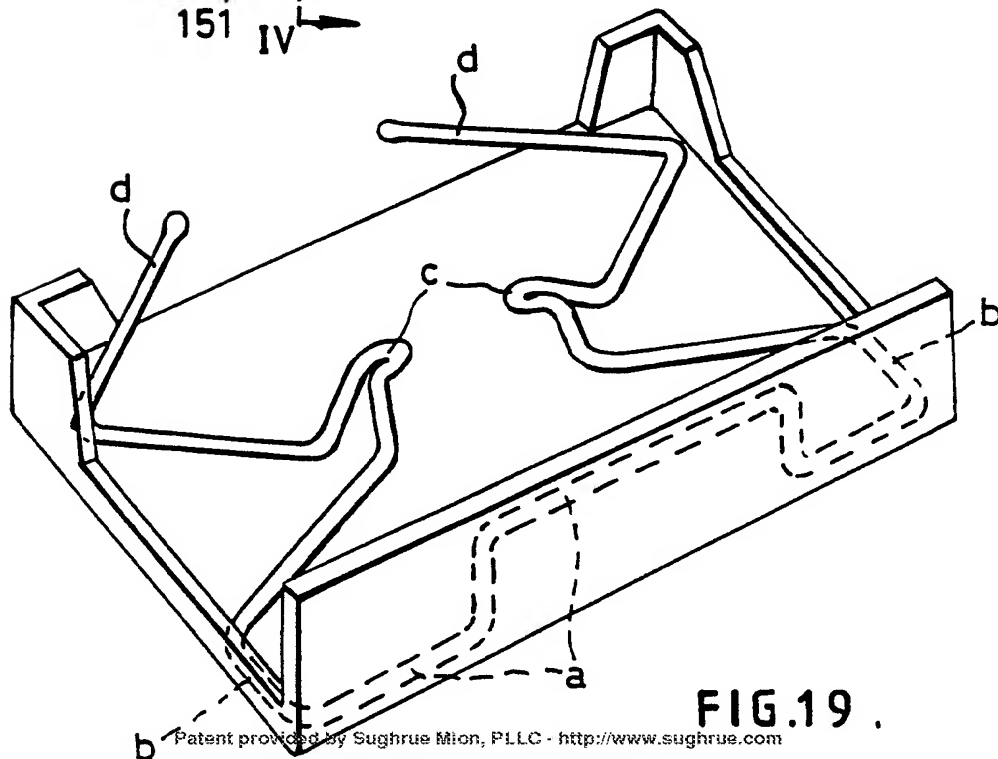


FIG. 19.

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INTERNATIONAL SEARCH REPORT

PCT/GB 92/01068

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 G11B33/04; G11B23/023		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	G11B	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	WO,A,8 911 719 (SUNNYLINE COMPUTER PRODUCTS GMBH)) 30 November 1989 see claims 1-22; figures ---	1-6, 9, 10, 12-16, 29, 30
X	US,A,4 702 369 (I. PHILOSOPHE) 27 October 1987 see the whole document ---	1-6, 12-16, 29, 30
X A	DE,A,2 343 487 (IDN INVENTIONS AND DEVELOPMENT OF NOVELTIES AG) 14 March 1974 see claims 1-12; figures --- -/-	1-4, 23, 25, 29 28
<p>¹⁰ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
15 SEPTEMBER 1992	28. 09. 92	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	DECLAT M. G.	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
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ON INTERNATIONAL PATENT APPLICATION NO. GB 9201068
SA 60957**

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ON INTERNATIONAL PATENT APPLICATION NO. GB 9201068
SA 60957**

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Page 2

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